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Frequency and Rate at Which Female Hummingbirds Tend Their Nests

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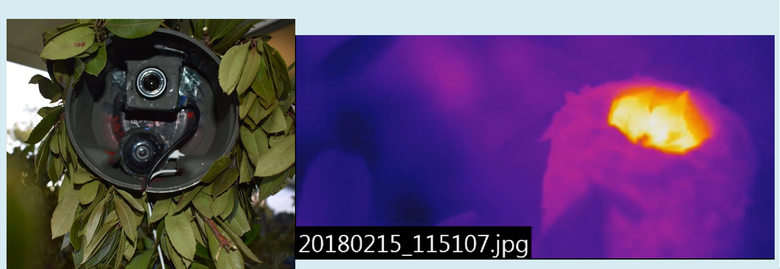
Introduction

- In the world of animals, the smaller the body, the faster the metabolism
- Hummingbirds are the smallest birds in the world, which means they must frequently eat nectar and bugs to maintain a high metabolism
- Hummingbird nests are very thermally sensitive and require the mother to frequently tend her nest to keep the eggs warm
- Monitoring behavior at nests analyzed using motion activated IP camera recordings of nests located at study sites throughout the Loyola Marymount University (LMU) campus
- Analysis of collected thermal images, will develop the understanding of the time female hummingbirds spend away from the nest versus the time spent incubating and brooding the offspring

- **Objective**
- To investigate attentiveness patterns throughout the January-March 2018 period for a nesting hummingbird, and compare attentiveness frequency between the incubation period of eggs and brooding stage of nestlings
- **Question**
  - Will the female hummingbird tend the nest more frequently during the presence of eggs or chicks?
- **Hypothesis**
  - Attentiveness will be higher while eggs are present, but less when chicks are present

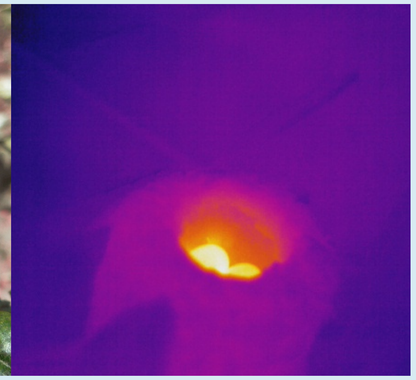
Methods

- **Funding**
  - Experiment.com Crowdfunding
- **Data Collection**
  - Nest searching on LMU campus
    - January 2018 – March 2018
  - Remote Thermal Imaging
    - FLIR Vue Pro R
- **Data Analysis**
  - Time lapses were created where a photo was captured every minute
  - Range of time for annotated days were from 5:00 – 20:00 (24-hour clock), from the first leave of the day, to the last return
  - Determined proportions and averages of time on/off nest over total time annotated for each day



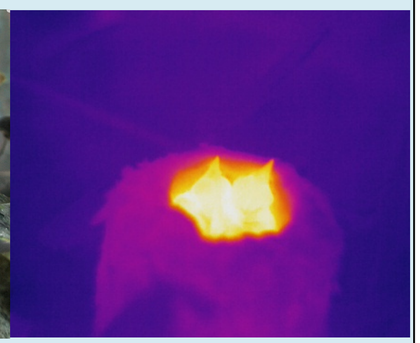
Data

Nest 3: Color photo of the absent female hummingbird during incubation period **(Figure 1)**



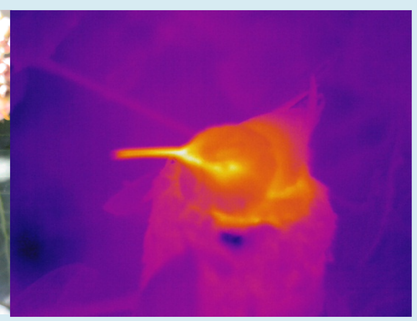
Nest 3: Thermal photo of the absent female hummingbird during incubation period **(Figure 2)**

Nest 3: Color photo of the nestlings without the female hummingbird at nest **(Figure 3)**



Nest 3: Thermal photo of nestlings while mother is away from the nest **(Figure 4)**

Nest 3: Color photo of the female hummingbird incubating the eggs **(Figure 5)**



Nest 3: Thermal photo of the female hummingbird incubating the eggs **(Figure 6)**

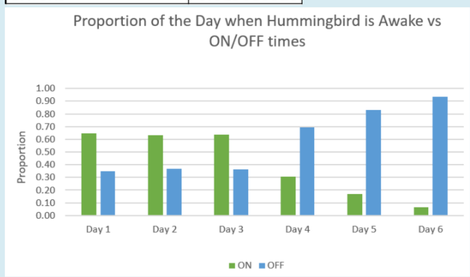
Results

Data Summary: decimal numbers on the last two rows represent the proportion to the number of times the hummingbird was on/off the nest vs the total time awake **(Table 1)**

DATA Summary	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Egg status	Eggs	Eggs	Eggs	Chicks	Chicks	Chicks
ON	440	427	428	214	120	46
OFF	238	250	244	483	582	664
TOTAL	678	677	672	697	702	710
ON	0.65	0.63	0.64	0.31	0.17	0.06
OFF	0.351032448	0.369276	0.36309524	0.6929699	0.829059829	0.935211

ON DATA SUMMARY	Average
EGGS	0.64
CHICKS	0.18
OFF DATA SUMMARY	Average
EGGS	0.361134635
CHICKS	0.819080323

Averages of the three proportions for the attentiveness of the female hummingbird in the presence eggs/chicks **(Table 2)**



Female hummingbird is at nest for about the same amount of time during the three days analyzed during incubation. Days 1-3 are incubation periods, and days 4-6 are brooding periods. **(Figure 8)**

Discussion

- Hypothesis was correct: Female hummingbird tended the nest more often in the presence of eggs than the presence of chicks
- Hummingbird was not at nest as often as a result to chicks being endothermic
- Only time mother needed to come back to nest was to feed and keep chicks warm during the night
- Mother might have been spending most of the time off nest to collect more food for herself, in addition to the two chicks
- Nestlings had filled the nest, and "data on attentive and inattentive periods at this time are lacking." (Howell and Dawson, 1954)
- **Future Research**
  - Include the variable of weather condition that could effect attentiveness
  - "Hummingbirds nesting in different environments must make corresponding adjustments in incubation behavior" (Vleck and Oecologia, 1981)

Literature Cited

Howell, T., & Dawson, W. (1954). Nest Temperatures and Attentiveness in the Anna Hummingbird. *The Condor, 56*(2), 93-97. doi:10.2307/1364665
Vleck, C.M. Oecologia (1981) 51: 199. https://doi.org/10.1007/BF00540601

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